

CLAIMS

1. A rear-projection image display, comprising:
a trichromatic image projecting section including three image projecting sections corresponding to colors of red, green, and blue, respectively, the three image projecting sections being arrayed in one horizontal plane, each of the three image projecting sections including an image display element for displaying an image according to an input signal, and an illuminating lens for enlarging and projecting the image displayed by the image display element; and
a transparent screen on which images formed with respective color lights projected by the trichromatic image projecting section are superimposed to be displayed,
wherein:
the transparent screen includes, in an order from a side of the trichromatic image projecting section:
a collimating means for converting incident light having a predetermined flare angle from each of the image projecting sections into telecentric light and allowing the telecentric light to exit therefrom;
a color-shading eliminating means having, on its light-incident surface, light-incident-side lenticular lenses for converging incident light from the collimating means in a horizontal plane, and on its light-outgoing surface, light-exit-side lenticular lenses having one-to-one correspondence to the light-incident-side lenticular lenses, so as to allow principal rays of the respective lights of the colors to be substantially parallel with one another and to exit, the respective lights being from the image projecting sections and having passed through the collimating means; and
a light diffusing means including a substrate sheet made of a transparent material and a plurality of micro beads made of a transparent material provided on the light-incident surface of the substrate sheet, light transmitting portions being formed between the substrate sheet and the micro beads, and the light-incident surface of the substrate sheet except for the light transmitting portions is covered with an opaque binder.
2. A rear-projection image display, comprising:
a trichromatic image projecting section including three image projecting sections corresponding to colors of red, green, and blue,

respectively, the three image projecting sections being arrayed in one horizontal plane, each of the three image projecting sections including an image display element for displaying an image according to an input signal, and an illuminating lens for enlarging and projecting the image displayed by the image display element; and

a transparent screen on which images formed with respective color lights projected by the trichromatic image projecting section are superimposed to be displayed,

wherein:

the transparent screen includes, in an order from a side of the trichromatic image projecting section:

a collimating means for converting incident light having a predetermined flare angle from each of the image projecting sections into telecentric light and allowing the telecentric light to exit therefrom;

a color-shading eliminating means having, on its light-incident surface, light-incident-side lenticular lenses for converging incident light from the collimating means in a horizontal plane, and on its light-outgoing surface, light-exit-side lenticular lenses having one-to-one correspondence to the light-incident-side lenticular lenses, so as to allow principal rays of the respective lights of the colors to be substantially parallel with one another and to exit, the respective lights being from the image projecting sections and having passed through the collimating means; and

a light diffusing means including, on its light-incident surface, lenticular lenses that converge incident light from the color-shading eliminating means in a horizontal plane, black stripes formed with a material having a light absorbing property in a region except for places where the incident light is converged and vicinities thereof, and a light diffusing layer made of a material containing a light diffusing material.

3. A rear-projection image display, comprising:

a trichromatic image projecting section including three image projecting sections corresponding to colors of red, green, and blue, respectively, the three image projecting sections being arrayed in one horizontal plane, each of the three image projecting sections including an image display element for displaying an image according to an input signal, and an illuminating lens for enlarging and projecting the image displayed by the image display element; and

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a transparent screen on which images formed with respective color lights projected by the trichromatic image projecting section are superimposed to be displayed,

wherein:

5 the transparent screen includes, in an order from a side of the trichromatic image projecting section:

a collimating means for converting incident light having a predetermined flare angle from each of the image projecting sections into telecentric light and allowing the telecentric light to exit therefrom;

10 a color-shading eliminating means having, on its light-incident surface, light-incident-side lenticular lenses for converging incident light from the collimating means in a horizontal plane, and on its light-outgoing surface, light-exit-side lenticular lenses having one-to-one correspondence to the light-incident-side lenticular lenses, so as to allow principal rays of the
15 respective lights of the colors to be substantially parallel with one another and to exit, the respective lights being from the image projecting sections and having passed through the collimating means; and

20 a light diffusing means including a substrate having, on its light-incident surface, lenticular lenses for converging incident light from the color-shading eliminating means in a horizontal plane, and a color layer formed at least in vicinities of light-incident surfaces of the lenticular lenses, a material of the substrate being non-colored, or colored to have a tint lighter than that of the color layer.

25 4. The rear-projection image display according to any one of claims 1 to 3, wherein the collimating means is a Fresnel lens sheet and its focal length is substantially equal to a distance from the collimating means to each of the three image projecting sections.

30 5. The rear-projection image display according to any one of claims 1 to 3, wherein the light-exit-side lenticular lenses of the color-shading eliminating means are placed substantially at positions where the light-incident-side lenticular lenses form images, respectively.

35 6. The rear-projection image display according to any one of claims 1 to 3, wherein a focal length of each of the light-exit-side lenticular lenses of the color-shading eliminating means is substantially equal to a distance

therefrom to corresponding one of the light-incident-side lenticular lenses.

7. The rear-projection image display according to any one of claims 1 to 3, wherein each of the light-exit-side lenticular lenses of the color-shading eliminating means has a width in a horizontal direction, the width covering an area where an image of the trichromatic image projecting section is formed by each of the light-incident-side lenticular lenses corresponding to each of the light-exit-side lenticular lenses.

10 8. The rear-projection image display according to any one of claims 1 to 3, wherein:

a width in a horizontal direction of the light-exit-side lenticular lenses of the color-shading eliminating means is narrower than a width in the horizontal direction of the light-incident-side lenticular lenses; and

15 a light absorbing agent is applied to spaces between any adjacent two of the light-exit-side lenticular lenses.

9. The rear-projection image display according to any one of claims 1 to 3, wherein the color-shading eliminating means is a lenticular lens sheet provided with the light-incident-side lenticular lenses on one surface thereof, and the light-exit-side lenticular lenses on the other surface thereof.